Introduction

While not all forms of pollution are anthropogenic, the artworks highlighted in the Pollution and Contamination E-museum engage with forms of human activity—industrial, consumer, agricultural, transportation-related—that add ecologically harmful elements into air, water, or land. Many of the artworks in the e-museum are also relevant to an environmental justice framework. Pollution disproportionately affects the most economically vulnerable human populations, thereby reinforcing and exacerbating other kinds of social inequities. This is because many industries flee countries or regions with stringent environmental regulations. This often makes pollution worse in impoverished regions and nations that are able to attract industry by relaxing or never instituting anti-pollution measures.

Large-scale human contamination of ecosystems is at least as old as the emergence of livestock farming, which geographically concentrated animal waste, and as old as early urbanization, which geographically concentrated human waste, as well as smoke from wood-burning fires. Several visitors to ancient Rome recorded that the city was often filled with a smoky haze that they could feel in their lungs. The modern history of pollution begins, however, in the eighteenth and nineteenth centuries, with the Industrial Revolution, which generated power by burning fossil fuels, dumped its waste into waterways and onto land, increased consumption of manufactured goods, and fueled rapid urbanization.

This history intensified over the course of the twentieth century, especially in the world’s most economically developed nations. Extractive industries and heavy manufacturing globally outstripped many nations’ capacity to keep emissions within absorbable ranges or to dispose of waste products in ways that did not cause substantial damage to land and water. Coal-burning power plants became (and still are) the leading cause of the emissions that create acid rain. The rise of the internal-combustion engine amplified fossil fuel emissions to a degree that changed the planet’s climate in ways we have only just begun to reckon with. Agriculture began to rely on new fertilizers and pesticides whose toxic runoffs damaged drinking water supplies and, in the case of DDT, harmed a broad range of wildlife populations. Petrochemical industries developed plastics and various “forever chemicals” that biodegrade so slowly that they have essentially become permanent components of the soil, oceans, and inland waterways. The development of nuclear energy introduced a new category of waste defined by its radioactive half-life. More recently, the constant innovation of digital technologies, which leads to the rapid obsolescence of digital products, has created a new category of contaminating waste, “e-waste,” comprised of plastic parts and harmful heavy metals that pollute the land and water.
Introduction

Environmental regulations in many nations have mitigated some of these harms, but the problems continue to grow. Despite extensive environmental regulations in the United States, for example, the 4.5% of the world’s population that lives in the United States is responsible annually for one-quarter of the world’s CO2 emissions, more than half of its hazardous waste, and nearly one-third of all waste.

The works in this e-museum—which date to the twentieth and twenty-first centuries—engage with various forms of anthropogenic environmental contamination. Different works in the e-museum depict: the polluting use of fossil fuels for power, in various industrial contexts; the growth of U.S. infrastructure around automobiles and trucks powered by internal combustion engines; the convergence of pollutants in densely populated urban contexts; the production and marketing of chemicals and plastics; and the industrial contamination of land, water, and air in various parts of the world. The museum also includes cartoons that register public awareness of pollution in the late twentieth-century United States. Many of the works in the e-museum have a social documentary quality. Yet, each work—documentary or not—implies some kind of stance towards the industries, practices, and environmental impacts that it depicts. We invite you to think critically about how different works use forms, content, and styles to create these stances, especially when considering their different aims and target audiences. How do these works make visible something that is largely invisible? How do they give everyday forms of pollution the status of notable events?

Keywords: pollution, emission, contamination, waste, air quality, water quality, soil quality, landfill, greenhouse gas, fossil fuels, coal, gasoline, jet fuel, steam, smog, smoke, chemicals, petrochemicals, plastic, extraction, deforestation, industry, capitalism, highways, automobiles, trains, airplanes, water treatment, landscape
Teaching Strategies: General Questions

Individually and collectively, the works in the gallery can help students think critically about how different artworks represent, comment on, and shape ideas and feelings about:

- Different industrial and consumer activities that pollute
- Ways that certain forms of pollution disproportionately impact populations and regions
- Ecological impacts of different industries
- Aesthetic genres and conventions that have developed for representing pollution
- Histories of labor related to pollution
- Histories of urbanization and infrastructure related to pollution
- Histories of gender, class, nationality, and race related to pollution
- Histories of settlement and colonialism related to pollution
- The emergence of public awareness of pollution

Each of these bulleted points can easily be converted into a general discussion prompt for a specific artwork by prefacing it with the phrase “How does this piece represent (or comment on, or shape ideas about, or prompt feelings about)…”?

[Image of Franklin Borough, Bethlehem Study by Frederic Whitaker (Object 2000.0032)]
Ecological and Cultural History

Introducing more specific ecological context for the kind of pollution that an individual artwork references can transform how students experience the work and provoke thoughtful discussion of how its significance might have changed over time. Two examples:

In the museum’s collection is an animation still for Dow chemical’s Saran Wrap* [Object 1994.464] that was likely created for a television commercial in the late 1970s or early 1980s (the design of the packaging in the image is similar to Saran Wrap* packaging from this period). Polyvinylidene chloride (PVDC), the material of which Saran Wrap* was originally composed, was created accidentally in a Dow laboratory in 1933 while developing dry cleaning chemicals. Saran Wrap*, the earliest plastic wrap, became the first product that Dow marketed and sold directly to consumers (Saran Wrap* is now a trademark owned by the S.C. Johnson corporation). The plastic wrap industry exploded in size over the next century, with a hundred companies now producing over 3 million tons annually for use in households and in industry. When not made from PVDC, or its relative PVC, plastic wraps are made from polyethylene.

Whatever their chemical composition, plastic wraps are major environmental pollutants. Older plastic wraps included chemical plasticizers that turned out to be carcinogens, something that made them toxic to home consumers using them to wrap foods, especially foods they were heating in the microwave. Other environmental concerns arise from plastic wraps’ disposal after use. Difficult to recycle on account of its tendency to clog recycling machinery, plastic wrap often ends up in landfills, incinerators, or the ocean. When PVDC and PVC plastics are incinerated, they release dioxin, a toxin whose detrimental effects on human development are well documented. When deposited in landfills, they leach this same toxin into the soil. When plastic wraps of any chemical composition are introduced to oceans, they contaminate wildlife. While the pollution of the ocean by plastics receives a lot of media attention, only about 1% of plastics end up there. However, plastic wraps comprise much of that 1%, and, compared to other plastics, they prove especially toxic for sea creatures and the animals that consume them (including humans). PVDC and PVC films collect and store harmful bacteria and heavy metals, and since they are more easily digested by fish and waterfowl than hard plastics, they then introduce these bacteria and heavy metals into the animals’ bodies.

Have your students discuss the ways in which this advertising image markets plastic wrap. What kind of consumer and what kinds of uses does the image imply? How does the ideological significance of the image alter once the viewer learns more about the ecological harms associated with plastic wraps?
American illustrator Alan Dunn drew this cartoon about air quality in May 1968 for The New Yorker magazine [Object 1979.1605]. Air quality and air pollution were emergent areas of public concern in the United States in the 1950s and early 1960s. Following a 1963 report that showed New York City had the poorest air quality in the United States, the city adopted an Air Quality Index in 1964, the data from which was published each day in The New York Times (presumably, this is the data that the husband in Dunn’s cartoon is reading aloud from the newspaper).

But it was the city’s “Great Smog” of 1966 that eventually served as the catalyst for political action. Over Thanksgiving weekend in 1966, seventeen months before Dunn created his cartoon, New York City was blanketed with a thick, smoky haze. In addition to disrupting Macy’s Thanksgiving Day Parade, the event produced widespread adverse health effects, some of them lasting. Though “The Great Smog” resulted from unusual atmospheric conditions that kept the same air mass over the city for days, it was symptomatic of a longer term deterioration of air quality tied to vehicular emissions, smoke from industry, toxic emissions from garbage incinerators, and unfiltered smoke and steam from coal-fired boilers. Nevertheless, the event, along with the Air Quality Index data published during it, did heighten awareness among New York City residents that they were often subjected to unacceptably high levels of carbon monoxide and sulfur dioxide, among other harmful airborne elements. Within a year of “The Great Smog,” Congress passed into law the Air Quality Act, an attempt to improve previous bills regulating air pollution by allowing stricter regional variations in regulation. That bill was strengthened and extended by the landmark Clean Air Act of 1970.

Have your students discuss Dunn’s cartoon as historical evidence for changing or evolving American attitudes towards air quality in the late 1960s. Who do your students take to be the primary audience for this cartoon, and how does that matter to their sense of its political significance? How do the identities of the figures in the cartoon (i.e., age, class, race, gender, nationality, and so forth) matter when analyzing its significance? What about its setting? What elements of the natural world are visible in this setting, and how do they matter to understanding its commentary?

“Would you care to know, dear, that your ‘hazy morn of an enchanted day in May’ is composed of six-tenths parts per million sulfur dioxide, two parts per million carbon monoxide, four parts per million hydrocarbons, three parts...”, Alan Dunn [Object 1979.1605]
The e-museum contains three photographs that American documentary photographer W. Eugene Smith took at various Monsanto chemical plants. Smith was on assignment for LIFE magazine as part of their January 1953 article “The Reign of Chemistry.” The article offered a positive look at the rapidly growing chemical industry, which its author called “a new keystone of the U.S. economy.” The article gushes about the many innovations that the chemical industry has produced in plastics, pharmaceuticals, fertilizers, biocides, textiles, and rubber, singling out “phosphorus compounds” as some of “the most useful chemicals known,” based on their widespread use in food, detergents, toothpastes, pharmaceuticals, and bleaches. The article focuses especially on Monsanto’s production of phosphates, styrene, chlorine, sulfur, Acrilon® fibers (a competitor to Rayon and Nylon), and the powdered detergent All®, as well as the company’s collaborations with the Atomic Energy Commission in trying to bring atomic energy online for electrical power production. The three images in this e-museum, all of which appear in the LIFE article, depict: the exterior of Monsanto’s Texas City plant, which manufactured styrene for use in paint, rubber, and plastics [Object 1984.130]; workers at a purification still at Monsanto’s St. Louis plant [Object 1984.129]; and a mound of a coarse chemical material (sulfur) being unloaded at its plant in Everett, Massachusetts, in preparation for its processing into sulfuric acid [Object 1984.128].
Monsanto often made the news in the late twentieth and early twenty-first century for various kinds of pollution. At the time that Smith was photographing Monsanto facilities in 1953, the company was a major producer of polychlorinated biphenyls (PCBs) and DDT. PCBs, “forever chemicals” used in a variety of electrical and petroleum products, were ultimately banned in 1979 for their proven harms to humans and animals (there are currently eight Superfund cleanup sites in the United States where PCBs are the main environmental contaminants). DDT, an insecticide widely used in urban, agricultural, and military contexts in the 1940s and 1950s, was finally banned in 1972 for its proven harm to large swathes of wildlife. Protesting the polluting effects of DDT—beginning in the 1940s, but stoked by the publication of Rachel Carson’s *Silent Spring* (1962)—galvanized the contemporary environmental movement. By the 1960s, Monsanto had become a major producer of the chemicals used to create “Agent Orange,” the notorious toxic herbicide and defoliant sprayed widely by the U.S. military during the Vietnam War. Most recently, Monsanto made headlines when a court judgment found its popular glyphosate-based herbicide RoundUp® to be carcinogenic.

Consider having students analyze the political significance of Smith’s Monsanto photographs without first telling them about the context in which they were originally published. Ask them to think about how Smith’s framing, perspective, use of light, and composition (including strong vertical and diagonal lines) shape our feelings about the Monsanto plants. Is Smith encouraging our admiration? Our criticism? Then, after sharing the above context, have them discuss how and why the photographs’ significance might have changed over time. What things have happened since the 1950s that lead many viewers today to interpret these photographs more critically, as images of chemical contamination?
Chinese American watercolorist Dong Kingman’s painting *White Hope* [Object 1966.421] captures an industrial scene in the United States in 1940. Born to immigrant parents in Oakland, California, as Dong Moy Shu, Kingman was raised in Hong Kong from age 5 to 18, before returning to Oakland and changing his name. He received art instruction in both China and the U.S. and regarded himself and his artistic style as a hybrid of Asian and European influences. As he put it, “I am Chinese when I paint trees and landscapes, but Western when I paint buildings, ships or three-dimensional subjects with sunlight and shadow.”

Kingman painted *White Hope* while he was employed as an artist for the WPA from 1935-1941. It depicts a treeless landscape whose dominant terrestrial forms are industrial buildings and whose smoke-heavy skies are filled with aircraft. Though the industrial complex is unidentified, it resembles Hangar One, at Moffat Field, on the peninsula in the Bay Area, near where Kingman lived. Built in 1933 to house a naval airship, Hangar One had been converted to a storage facility for military training aircraft by 1940, the date of Kingman’s painting.

The painting’s title, *White Hope*, derives from “the Great White Hope,” a racist epithet that refers to a White person potentially capable of defeating a non-White opponent. The phrase was coined for the White boxer Jim Jeffries, whom a racist sporting press had coaxed out of retirement in 1910 to try to unseat Jack Johnson, the first Black heavyweight boxing champion. If the painting is of Hangar One, then it might refer to the abandonment of the white hangar’s original purpose, as early hope that airships might prove militarily useful had been recently dashed, in 1937, after the fiery explosion of the Hindenburg passenger airship in New Jersey.

Kingman could not have anticipated the Japanese bombing of Pearl Harbor in 1941 and the fierce wave of racist anti-Asian and anti-Asian-American sentiment that it would unleash. Nevertheless, by September 1940, anti-Asian and anti-Asian-American sentiment was on the rise, due to Japan’s formal alliance with Nazi Germany, at a time when many in the U.S. also regarded entry into war against Germany and Japan as inevitable. The U.S. had begun ramping up industrial production of ships and aircraft in 1939, after German forces had beaten the British military into retreat. This offers potentially important context for reading Kingman’s image of military airpower and industry, as well as for interpreting its title. Like many young men of his generation, Kingman himself was drafted into the U.S. Army, in 1942.

Have your students discuss to what extent they think Kingman’s painting is trying to make an ecological commentary. What’s their evidence for this? How does the color of the atmosphere and smoke factor into their analysis? How does knowledge about Kingman’s ethnic background potentially affect the way one interprets the image generally, or its depiction of air pollution specifically, in relation to its title? How might the image and title read differently if it were known to be the work of a White artist?
Visual Analysis

Any of the above approaches can be combined with more targeted questions about elements of form, composition, color, style, or medium, based on student contributions to discussion. For example:

- How do distinct artistic mediums permit different types of engagement with visible air pollution? For instance, what sorts of thinking about pollution does photography enable that is different from painting (or vice versa)? What do distinct artistic mediums reveal about pollution through how they represent it?
- Pollution is sometimes invisible as it is occurring. Its effects are also often invisible (until they’re suddenly not). What works in the e-museum make visible the otherwise hidden causes or impacts of pollution? How do they do this?
- How do the style and colors of the artwork factor into the way that you’re experiencing it as an image that codes what it is depicting positively? How might a different style or a different color scheme for the exact same composition have contributed to a different affective experience than the one you’re articulating? To what extent would you characterize its colors as “natural” or “unnatural” in context, and how does that matter to your response?
- What decisions do you see the artist making about what to include and not to include in the frame? What about the angle or perspective they adopt in the image? How do these compositional choices contribute to your sense of the kind of ecological statement you see the artwork making (or failing to make) about the pollution it depicts? Specific to photographs, what elements of the artwork appear to be beyond the artist’s control? To what extent (or in what ways) is the subject of the artwork also one of its authors?
- How do the figures matter to how you are interpreting this artwork’s ecological project or significance? What about the ground? The relation between the two? In the case of works that have multiple figures, what different functions do these figures serve? Or what different relational vectors to other figures, or to their surroundings, do they establish?
- There is a long tradition in art of creating works that try to activate an experience of “the sublime,” or a sense of being pleasurably overwhelmed or awed, in relation to natural landscapes (traditional subjects for such art include massive mountains and plunging waterfalls). Art historians refer to depictions of industry and manufacturing that do the same as the “industrial sublime.” Would you characterize the image of pollution in this artwork as an instance of “the industrial sublime”? Even when the image seemingly tries to make what it depicts “ugly,” does it also seem to be trying to overwhelm the viewer or make the viewer experience some kind of pleasure or awe? How does this matter to thinking about the work’s commentaries on pollution? What are alternatives to the “industrial sublime” for engaging with different contaminating processes and their ecological significance?
Pairings and Groupings

Many of the works in the “Pollution and Contamination” e-museum make for critically provocative pairings or groups. Some of our suggested groupings for discussion include:

- **Coal burning**: stereograph of the [Russian Fleet](Object 1992.645); Berenice Abbott’s photograph [Hoboken Railroad Yard, New Jersey](Object 1981.2702); Louis Lozowick’s lithograph [Steel Valley](Object 1997.0043); Harry Gottlieb's screenprint [Change of Shift](Object 1966.2126); Reginald Marsh’s print [Jersey City Landscape](Object 1964.086); Berenice Abbott’s photograph [Steam + Felt = Hats, 65 West 39th Street (March 1st, 1938)](Object 2007.0059); Dong Kingman’s watercolor [White Hope](Object 1966.421); Elizabeth Olds’s screenprint [Harlem River Bridges](Object 1997.0011); Frederic Whitaker’s watercolor [Franklin Borough, Bethlehem Steel](Object 2000.0032); and Arthur Osver’s oil painting [Evening Smoke](Object 1953.02)

- **Urban air pollution (U.S. contexts)**: Berenice Abbott’s photographs [Hoboken Railroad Yard, New Jersey](Object 1981.2702) and [Steam + Felt = Hats, 65 West 39th Street (March 1st, 1938)](Object 2007.0059); Elizabeth Olds’s screenprint [Harlem River Bridges](Object 1997.0011); Berenice Abbott’s photograph [Pepsi Truck on the New Jersey Turnpike, Fort Lee, New Jersey](Object 1981.2798); Richard Florsheim’s lithographs [Burn Off](Object 1977.098) and [Smog](Object 1977.170); Tom Blackwell’s screenprint [I-160 North](Object 1995.0544); and Emilio Sanchez’s lithograph [Crosstown Traffic](Object 2010.0162)

- **Industrial air pollution**: Louis Lozowick’s lithograph [Steel Valley](Object 1997.0043); Harry Gottlieb’s screenprint [Change of Shift](Object 1966.2126); Raúl N. Aguiano’s lithograph [Lime Kilns](Object 1958.40.07); Dong Kingman’s watercolor [White Hope](Object 1966.421); Berenice Abbott’s photograph of the Red River Sawmill in northern California [Object 1981.2389]; Arthur Osver’s 1953 oil painting [Evening Smoke](Object 1953.02); Frederic Whitaker’s watercolor [Franklin Borough, Bethlehem Steel](Object 2000.0032); Alan Dunn’s cartoon "Would you care to know dear..." [Object 1979.1605]; Richard Florsheim’s lithographs [Well Towers](Object 1977.038), [Smog](Object 1977.170), and [Burn Off](Object 1977.098); Richard Harden’s lithograph [Dark Plain](Object 1992.731); “Mother Earth Weeps” Every Day is Earth Day by an unidentified artist [Object 2012.0221]; Ed Kashi’s photographs [AFIESERE, NIGERIA](Object 2022.0020) and [FINIMA, NIGERIA](Object 2022.0021); and Nick Brandt’s photograph [Factory with Giraffe](Object 2022.0087)
Pairings and Groupings cont.


- **Airplane emissions**: Dong Kingman's watercolor *White Hope* [Object 1966.421]; and Frederic Whitaker’s watercolor *painting of a jet airplane* [Object 2000.0048]


- **Pollution in Africa**: Ed Kashi's photographs *AFIESERE, NIGERIA|2004* [Object 2022.0020] and *FINIMA, NIGERIA|2006* [Object 2022.0021]; Nick Brandt's photographs *Factory with Giraffe* [Object 2022.0087] and *Wasteland with Lion* [Object 2022.0095]
Assignments and Further Resources

For general assignments related to this and other e-museums, consult "Art, Ecology, and Climate Project E-Museums: A Teaching Guide." You can access the guide via the Project’s webpage (under the “Learn” pulldown menu on the Syracuse University Art Museum’s website).

For information on the oil industry’s polluting of air, land, and water in Nigeria (relevant to Ed Kashi’s photographs AFIESERE, NIGERIA | 2004 [Object 2022.0020] and FINIMA, NIGERIA | 2006 [Object 2022.0021], both in this e-museum), see the Art, Ecology, and Climate Project’s teaching guide to “The Anthropocene” e-museum, which is available via the Project’s webpage. More images of pollution and contamination can be found in several of the other Art, Ecology, and Climate e-museums including “Power and Energy,” “Extraction,” and “The Anthropocene.”

An Art, Ecology, and Climate Project teaching guide for W. Eugene Smith’s 1950s photograph of a country club in Pittsburgh, PA (a work relevant to Pollution and Contamination, though not included in this e-museum) can be found on the Project’s webpage. The guide offers biographical and other information about Smith that is potentially relevant to his three photographs of Monsanto chemical plants that are included in the “Pollution and Contamination” e-museum.
Pollution and Contamination

Selected Recent Books

Art, Ecology, & Climate Project

Project Team and Sponsors

Professor Mike Goode
Professor of English and William P. Tolley Distinguished Professor in the Humanities

Kate Holohan
Curator of Education and Academic Outreach, Syracuse University Art Museum

Jeffrey Adams
Ph.D Student in English

Jeanelle Cho
'24 (Architecture)

Abigail Greenfield
'25 (History and Political Philosophy)